

ABSTRACT

A device for removing contaminants from a natural gas stream is provided. The device comprises a first adsorbent positioned within a first fluidized bed operating at a first predetermined temperature for removing at least a portion of the contaminants from the natural gas stream and creating a partially sweetened natural gas stream. A second adsorbent is positioned within a second fluidized bed operating at a second predetermined temperature for receiving the partially sweetened natural gas stream with the second adsorbent removing at least a portion of the contaminants from the partially sweetened natural gas stream. Furthermore, a conversion apparatus can be provided for converting H_2S within the removed contaminants to elemental sulfur and hydrogen at a third predetermined temperature.